



US005637113A

United States Patent [19]**Tartaglia et al.**[11] **Patent Number:** **5,637,113**[45] **Date of Patent:** **Jun. 10, 1997**[54] **POLYMER FILM FOR WRAPPING A STENT STRUCTURE**[75] **Inventors:** **Joseph M. Tartaglia**, Redwood City;
Joseph P. Loeffler; **Todd H. Turnlund**,
both of Mountain View, all of Calif.[73] **Assignee:** **Advanced Cardiovascular Systems, Inc.**, Santa Clara, Calif.[21] **Appl. No.:** **355,402**[22] **Filed:** **Dec. 13, 1994**[51] **Int. Cl.⁶** **A61F 2/06**[52] **U.S. Cl.** **623/1; 623/11; 604/104;**
604/106; 604/194[58] **Field of Search** **623/1, 11; 606/191,**
606/194; 604/104, 106[56] **References Cited****U.S. PATENT DOCUMENTS**

3,839,743	10/1974	Schwarcz .
4,346,028	8/1982	Griffith .
4,377,030	3/1983	Beck et al. .
4,633,873	1/1987	Dumican et al. .
4,656,083	4/1987	Hoffman et al. .
4,718,907	1/1988	Karwoski et al. .
4,722,335	2/1988	Vilasi .
4,723,549	2/1988	Wholey et al. .
4,732,152	3/1988	Wallsten et al. .
4,733,665	3/1988	Palmaz .
4,739,762	4/1988	Palmaz .
4,768,507	9/1988	Fischell et al. .
4,776,337	10/1988	Palmaz .
4,816,339	3/1989	Tu et al. .
4,878,906	11/1989	Lindemann et al. .
4,879,135	11/1989	Greco et al. .
4,994,298	2/1991	Yasuda .
5,019,090	5/1991	Pinchuk .

(List continued on next page.)

FOREIGN PATENT DOCUMENTS

0 604 022	1/1994	European Pat. Off. .
0 578 998	6/1994	European Pat. Off. .
0 621 017	10/1994	European Pat. Off. .

0623354	11/1994	European Pat. Off. .
44 07 079	9/1994	Germany .
WO91/17789	11/1991	WIPO .
WO93/06792	4/1993	WIPO .
WO-A-95		
29647	11/1995	WIPO .

OTHER PUBLICATIONS

"IEEE Transactions on Biomedical Engineering," vol. BME-27, No. 11, Nov. 1980.

"Glow Discharge Polymers as Coatings for Implanted Devices," by Allen W. Hahn, et al., printed by John M. Dalton Research Center, University of Missouri (1981).

(List continued on next page.)

Primary Examiner—Paul B. Prebilic*Attorney, Agent, or Firm*—Fulwider Patton Lee & Utecht

[57]

ABSTRACT

The drug loaded stent includes an expandable stent structural member, and a planar sheet of polymeric material attached to the outside of the expandable stent structural member. The polymeric material is preferably bioabsorbable, and loaded or coated with a therapeutic agent or drug to reduce or prevent restenosis in the vessel being treated. The polymer material can be attached to the metal stent at one or more points, and wrapped in a coil around the stent in an unexpanded state, to uncoil and expand in diameter to substantially match the expanded diameter of the metal stent; or can be wrapped tightly around the stent structural member and attached to itself, to stretch radially when the stent structural member is expanded. In another currently preferred embodiment, a combination of a stent structural member and a polymeric film wrapping can be provided with a coating of lubricious material. The lubricious material can be polyethylene oxide, polyethylene glycol, polyethylene acetate, polyvinyl pyrrolidone, polyvinyl alcohol, polyacrylamide, hydrophilic soft segment urethanes, some natural gums, polyanhydrides or other similar hydrophilic polymers, and combinations thereof. The layer of lubricious material protects the stent from the guide or the body lumen in which the stent is inserted by providing a low friction surface over the stent.

10 Claims, 6 Drawing Sheets